

**What is claimed is:**

1. A combined ventilating and air conditioning system, comprising:

an air conditioner, which comprises a compressor, a first heat exchanger for heating or  
5 cooling indoor spaces and a second heat exchanger, a refrigerant passage controller for guiding a  
refrigerant compressed by the compressor to the first heat exchanger or second heat exchanger  
according to a driving mode of the system, and an expansion device expanding a high-  
temperature and high-pressure refrigerant, the expansion device being provided between the first  
heat exchanger and the second heat exchanger;

10 a first air duct for guiding outdoor air to the indoor spaces, the first air duct being capable  
of opening and closing;

a second air duct for guiding indoor air to outdoors, the second air duct being capable of  
opening and closing and installed in such a manner that part of the second air duct intersects with  
the first air duct;

15 a third air duct for guiding the indoor air to the outdoors, the third air duct being capable  
of opening and closing;

a regenerative heat exchanger, being provided in an intersection between the first and  
second air ducts, for exchanging heat between the indoor air and the outdoor air passing through  
the intersection; and

20 blowing fans for controlling airflows, being provided in the first air duct, in the second  
air duct, and in the third air duct, respectively,

wherein the compressor and the second heat exchanger are provided in the third air duct.

2. The combined ventilating and air conditioning system of claim 1, wherein the driving mode comprises:

a first mode for cooling the indoor spaces being closed;

a second mode for cooling and ventilating the indoor spaces;

5 a third mode for heating the indoor spaces being closed;

a fourth mode for heating and ventilating the indoor spaces; and

a fifth mode only for ventilating the indoor spaces.

10 3. The combined ventilating and air conditioning system of claim 2, wherein the first heat exchanger is provided nearby an inlet of the first air duct through which the outdoor air flows into indoor spaces.

15 4. The combined ventilating and air conditioning system of claim 3, wherein the second heat exchanger is provided nearby an outlet of the third air duct through which the indoor air flows out.

5. The combined ventilating and air conditioning system of claim 4, wherein the regenerative heat exchanger comprises:

a first channel through which an air from an outside via the first air duct passes; and

20 a second channel through which an air from the indoor spaces via the second air duct passes, the second channel being in contact with the first channel.

6. The combined ventilating and air conditioning system of claim 5, wherein the second channel comprises a plurality of pipes that cross the first channel.

7. The combined ventilating and air conditioning system of claim 5, wherein the first channel and the second channel are layered, crossing alternately.

5           8. The combined ventilating and air conditioning system of claim 7, wherein each of the first and second channels comprises zigzag-shaped plates.

9. The combined ventilating and air conditioning system of claim 5, wherein the first and second channels are made of aluminum.

10           10. The combined ventilating and air conditioning system of claim 5, further comprising a dehumidifying device being provided in the first air duct so as to remove humidity from the outdoor air which flows through the first air duct.

15           11. The combined ventilating and air conditioning system of claim 10, wherein the first channel and the second channel are layered, crossing alternately.

20           12. The combined ventilating and air conditioning system of claim 10, wherein the dehumidifying device is provided between the regenerative heat exchanger and the first heat exchanger.

13. The combined ventilating and air conditioning system of claim 12, wherein a blowing fan of the first air duct is provided between the dehumidifying device and the first heat exchanger.

14. The combined ventilating and air conditioning system of claim 5, wherein the third air duct is installed parallel with the first air duct.

5        15. The combined ventilating and air conditioning system of claim 14, wherein the first channel and the second channel are layered, crossing alternately.

16. The combined ventilating and air conditioning system of claim 15, wherein each of the first and second channels comprises zigzag-shaped plates.

10

17. The combined ventilating and air conditioning system of claim 16, wherein the first and second channels are made of aluminum.

18. The combined ventilating and air conditioning system of claim 15, further comprising  
15 a dehumidifying device coated with a desiccant material for absorbing humidity from air flowing through the first air duct, and for emitting the absorbed humidity to air flowing through the third air duct.

19. The combined ventilating and air conditioning system of claim 18, wherein the  
20 desiccant material comprises silica gel.

20. The combined ventilating and air conditioning system of claim 18, wherein the dehumidifying device comprises:

a axis installed parallel with the first and third air ducts;

a plurality of blades being radially extended out of the axis at regular intervals; and  
a rim encompassing ends of the blades.

21. The combined ventilating and air conditioning system of claim 20, wherein each of  
5 the blades has a plurality of holes through which air passes.

22. The combined ventilating and air conditioning system of claim 18, wherein the  
dehumidifying device is provided between the first heat exchanger and the regenerative heat  
exchanger.

10

23. The combined ventilating and air conditioning system of claim 22, further comprising  
a reheater for reheating air guided from the second heat exchanger to the dehumidifying device,  
the reheater being provided in the third air duct.

15 24. The combined ventilating and air conditioning system of claim 22, wherein a blowing  
fan in the first air duct is provided between the dehumidifying device and the first heat exchanger.

25. The combined ventilating and air conditioning system of claim 23, wherein a blowing  
fan in the third air duct is provided between the dehumidifying device and the second heat  
20 exchanger.

26. The combined ventilating and air conditioning system of claim 25, wherein a blowing  
fan for the third air duct is provided between the dehumidifying device and the reheater.

27. The combined ventilating and air conditioning system of claim 3, further comprising:  
a ventilation duct for guiding the outdoor air directly into the indoor spaces, being connected to the first air duct between the blowing fan in the first air duct and the first heat exchanger.

5

28. The combined ventilating and air conditioning system of claim 27, wherein the ventilation duct comprises:

a damper provided near a juncture of the ventilation duct and the first air duct, being fastened and rotated by a hinge, so as to selectively open or close the ventilation duct and the  
10 first air duct.

29. The combined ventilating and air conditioning system of claim 23, wherein each of the first and the second channels comprises zigzag-shaped plates.

15 30. The combined ventilating and air conditioning system of claim 29, wherein the first and second channels are made of aluminum.

31. The combined ventilating and air conditioning system of claim 29, wherein the desiccant material comprises silica gel.

20

32. The combined ventilating and air conditioning system of claim 31, wherein the dehumidifying device comprises:

a axis installed parallel with the first and third air ducts;

a plurality of blades being radially extended out of the axis at regular intervals; and

a rim encompassing ends of the blades.

33. The combined ventilating and air conditioning system of claim 32, wherein each of the blades has a plurality of holes through which air passes.

5

34. The combined ventilating and air conditioning system of claim 32, wherein the blowing fan in the first air duct is provided between the dehumidifying device and the first heat exchanger.

10 35. The combined ventilating and air conditioning system of claim 34, wherein a blowing fan in the third air duct is provided between the dehumidifying device and the reheater.

36. The combined ventilating and air conditioning system of claim 35, further comprising:

15 a ventilation duct for guiding the outdoor air directly into the indoor spaces, being connected to the first air duct between the blowing fan in the first air duct and the first heat exchanger.

20 37. The combined ventilating and air conditioning system of claim 36, wherein the ventilation duct comprises:

a damper provided near a juncture of the ventilation duct and the first air duct, being fastened and rotated by a hinge, so as to selectively open or close the ventilation duct and the first air duct.

38. The combined ventilating and air conditioning system of claim 37, wherein the first and the second channels are made of aluminum.

39. The combined ventilating and air conditioning system of claim 38, further comprising  
5 a humidity sensor, for measuring humidity of outdoor air flowing into the first air duct.

40. The combined ventilating and air conditioning system of claim 39, wherein each of the blades has a plurality of holes through which air passes.